

**IN THE CLAIMS:**

- 1 1. (Currently Amended) A system for indexing and manipulating backup data stored on a  
2 destination storage system, comprising:  
3 | one or more source ~~servers~~ storage systems configured to transmit the backup data  
4 to the destination storage system;  
5 a management application executed by a processor, wherein the management ap-  
6 | plication is configured to ~~(a)~~ communicate with the destination storage system and further  
7 configured to access data identifiers related to the backup data organized in a directory  
8 tree structure representing a plurality of persistent consistency point images (PCPIs) of  
9 | the backup data, wherein each PCPI is associated with a creation time, ~~(b)~~ scan a root of  
10 each PCPI comprising the directory tree to generate an index of directories, files, or  
11 | qtrees associated with the directory tree, and ~~(c)~~ organize the data identifiers into a struc-  
12 ture that enables the backup data to be displayed; and  
13 a user interface to select a directory, file, or qtree to view, wherein the manage-  
14 ment application is further configured to return a list of the selected directory, file, or  
15 qtree and one or more versions of the selected directory, file, or qtree.
- 1 2. (Original) The system as set forth in claim 1 further comprising a database that stores  
2 the data identifiers and rules for handling the data identifiers for retrieval by the user in-  
3 terface and the management application.
- 1 3. (Previously Presented) The system as set forth in claim 2 further comprising, in the  
2 destination storage system, a network data management protocol (NDMP) extension  
3 communicating with a storage operating system of the destination storage system and  
4 providing NDMP-based communication between the management application and the  
5 storage operating system.
- 1 4. (Original) The system as set forth in claim 3 further comprising a job framework that  
2 organizes a plurality of backup operations and restore operations by the management ap-

3 plication and that communicates with the user interface so as to enable a user to access  
4 information with respect to status of the backup operations and restore operations organ-  
5 ized by the job framework.

1 5. (Currently Amended) The system as set forth in claim 4 further comprising a scheduler  
2 that interfaces with the source storage system and that performs the backup operations,  
3 transmitting the backup data from the source storage system to the destination storage  
4 system at a predetermined time interval.

1 6. (Currently Amended) The system as set forth in claim 1 wherein the user interface  
2 comprises a screen that enables a user to set a desired lag time after which failure to  
3 complete a scheduled backup operation ~~caused~~ causes an event to occur.

1 7. (Currently Amended) The system as set forth in claim 1 further comprising the user  
2 interface to select ~~(a)~~ a listing of source data entries indexed by names of the source stor-  
3 age system and ~~(b)~~ a listing of source data entries indexed by names of volumes of the  
4 destination storage system in which the backup data from the source data resides.

1 8. (Previously Presented) The system as set forth in claim 7 wherein each of the entries of  
2 each listing comprises a browse backups button that enables a user to view backup data  
3 stored on the destination storage system that is associated respectively with each of the  
4 entries.

1 9. – 11. (Cancelled)

1 12. (Previously Presented) The system as set forth in claim 8 wherein each of the entries  
2 of each listing comprises a restore button that enables a user to view restorable backup  
3 data structures with respect to each of the entries and to restore the backup data structures  
4 to the source data.

1 13. (Cancelled)

1 14. (Currently Amended) The system as set forth in claim 12 wherein each qtree com-  
2 | prises one or more qtree relationships with respect to other qtrees within the source stor-  
3 | age system.

1 15. (Previously Presented) The system as set forth in claim 1 wherein the user interface  
2 comprises a command for destroying a qtree relationship between the source data and a  
3 selected volume of the backup data in the destination storage system.

1 16. (Previously Presented) The system as set forth in claim 15 wherein the management  
2 application is configured to delete a respective qtree associated with the qtree relationship  
3 on the destination storage system in response to activation of the command for destroying  
4 the qtree relationship.

1 17. (Previously Presented) The system as set forth in claim 1 further comprising, in the  
2 user interface, a screen that enables selected data of the source data to be listed as entries  
3 and to be transmitted as the backup data to the destination storage system at a time sepa-  
4 rate from a scheduled backup time.

1 18. (Currently Amended) A method for indexing and manipulating backup data stored on  
2 | a destination storage system from source data stored a source storage system, comprising:  
3 |       communicating, by a management client, with the destination storage system and  
4 |       accessing data identifiers related to the backup data organized in a tree structure and rep-  
5       resenting a plurality of persistent consistency point images (PCPIs) of the data, each with  
6       associated information related to creation time;  
7       scanning the plurality of PCPIs to generate an index of directories, files, or qtrees  
8       created at different points in time;

9           organizing the data identifiers into a structure that enables the data to be displayed  
10 according to the directory, the file, or the qtree; and  
11           selecting, on a user interface, a directory, file, or qtree to view, wherein the man-  
12 | agement ~~application-client~~ returns a list of the selected directory, file, or qtree created at  
13 different points in time.

1   19. (Original) The method as set forth in claim 18 further comprising storing, in a data-  
2 base, the data identifiers and rules for handling the data identifiers for retrieval by the  
3 user interface and the management application.

1   20. (Currently Amended) The method as set forth in claim 19 further comprising provid-  
2 | ing, in the destination storage system, a network data management protocol (NDMP) ex-  
3 | tension communicating with a storage operating system of the destination storage system  
4 and providing NDMP-based communication between the management application and  
5 the storage operating system.

1   21. (Original) The method as set forth in claim 20 further comprising organizing, in a job  
2 framework, a plurality of backup operations and restore operations by the management  
3 application and that communicates with the user interface so as to enable a user to access  
4 information with respect to status of the backup operations and restore operations organ-  
5 ized by the job framework.

1   22. (Currently Amended) The method as set forth in claim 21 further comprising interfac-  
2 | ing a scheduler with the source storage system and performing, at scheduled times,  
3 | backup operations that transmit the backup data from ~~a-the~~ source storage system to the  
4 destination storage system at a predetermined time interval.

1 23. (Previously Presented) The method as set forth in claim 22 further comprising ena-  
2 bling a user to set a desired lag time after which failure to complete a scheduled backup  
3 operation causes an event to occur.

1 24. (Currently Amended) The method as set forth in claim 18 further comprising select-  
2 ing (a) a listing of source data entries indexed by names of the source storage system and  
3 (b) a listing of source data entries indexed by names of volumes of the destination storage  
4 system in which the backup data from the source data resides.

1 25. (Currently Amended) The method as set forth in claim 24 further comprising enabling  
2 a user to view backup data stored on the destination storage system that is associated re-  
3 spectively with each of the entries.

1 26. – 28. (Cancelled)

1 29. (Previously Presented) The method as set forth in claim 24 further comprising ena-  
2 bling a user to view restorable backup data structures with respect to each of the entries  
3 and to restore the backup data structures to the source data.

1 30. (Cancelled)

1 31. (Currently Amended) The method as set forth in claim 18 wherein each qtree com-  
2 prises qtree relationships with respect to other qtrees within the source storage system.

1 32. (Currently Amended) The method as set forth in claim 18 further comprising provid-  
2 ing, in the user interface, a command for destroying a qtree relationship between source  
3 data and a selected volume of the backup data in the destination storage system.

1 33. (Currently Amended) The method as set forth in claim 32 further comprising, in re-  
2 sponse to activation of the command for destroying the qtree relationship, deleting a re-  
3 | spective qtree associated with the qtree relationship on the destination storage system.

1 34. (Currently Amended) The method as set forth in claim 18 further comprising provid-  
2 ing, in the user interface, a screen that enables selected data of the source data to be listed  
3 | as entries and to be transmitted as the backup data to the destination storage system at a  
4 time separate from a scheduled backup time.

1 35. (Previously Presented) A method for managing backup of data, comprising:  
2 scanning a plurality of persistent consistency point images (PCPIs) stored on a  
3 destination storage system;  
4 generating an index of qtrees in response to scanning the plurality of PCPIs,  
5 wherein each qtree has one or more versions created at different points in time;  
6 selecting a particular qtree to view; and  
7 displaying each version of the particular qtree created at the different points in  
8 time.

1 36. (Cancelled)

1 37. (Previously Presented) The method as set forth in claim 35 further comprising format-  
2 ting information into a network data management protocol (NDMP).

1 38. (Currently Amended) The method as set forth in claim 35 further comprising activat-  
2 | ing user interface buttons associated with entries of the displayed qtree ~~to conduct~~.

1 39. (Currently Amended) A computer-readable medium containing executable program  
2 instructions executed by a processor, comprising:

3           program instructions that scan a plurality of persistent consistency point images  
4 (PCPIs) stored on a destination storage system;

5           program instructions that generate~~generating~~ an index of qtrees in response to  
6 scanning the plurality of PCPIs, wherein each qtree has one or more versions created at  
7 different points in time;

8           program instructions that select a particular qtree to view; and

9           program instructions that display each version of the particular qtree created at the  
10 different points in time.

1   40. (Cancelled)

1   41. (Previously Presented) The computer-readable medium as set forth in claim 39 fur-  
2 ther comprising program instruction that format information into a network data man-  
3 agement protocol (NDMP).

1   42. (Previously Presented) A system, comprising:

2           a source storage system configured to generate a plurality of persistent consis-  
3 tency point images (PCPIs) associated with a particular directory tree, and further config-  
4 ured to transfer the plurality of PCPIs to a destination storage system;

5           the destination storage system configured to execute a management client,  
6 wherein the management client is configured to organize the plurality of PCPIs into an  
7 index using a database to allow the plurality of PCPIs to be displayed in (a) a listing of  
8 source data entries indexed by the particular directory tree, wherein each PCPI of the par-  
9 ticular directory tree is created at one or more different times (b) a listing of source data  
10 entries indexed by names of the source storage system, and (c) a listing of source data  
11 entries indexed by names of volumes of the destination storage system in which backup  
12 data from the source storage system resides; and

13           an interface configured to select a data entry for the particular directory tree, and  
14   the management client further configured to return a list of the plurality of PCPIs associ-  
15   ated with the particular directory tree.

1   43. – 45. (Cancelled)

1   46. (Previously Presented) The system of claim 42, wherein the database stores the plu-  
2   rality of PCPIs and rules for handling the plurality of PCPIs for retrieval by the interface  
3   and the management client.

1   47. (Previously Presented) The system of claim 42, wherein the source storage system,  
2   upon initialization, sends a base PCPI and select data to the destination storage system.

1   48. (Previously Presented) The system of claim 42, further comprising a scheduler that  
2   interfaces with the source storage system and performs backup operations of transmitting  
3   the backup data comprising one or more PCPIs and change data from the source storage  
4   system to the destination storage system at a predetermined time interval.

1   49. (Previously Presented) A method, comprising:

2           transferring a plurality of persistent consistency point images (PCPIs) from a plu-  
3   rality of source servers to at least one destination storage system;

4           scanning the plurality of PCPIs to create an index of data structures on the at least  
5   one destination storage system, wherein each data structure comprises a plurality of qtree  
6   versions each created at different points in time;

7           selecting a particular data structure to view;

8           returning all qtree versions created at the different points in time for the particular  
9   data structure; and

10          selecting a particular qtree from all the returned qtree versions created at different  
11   points in time to restore.



1   50. (Previously Presented) A system, comprising:  
2           at least one source server configured to transfer a plurality of persistent consis-  
3   tency point images (PCPIs) to at least one destination storage system;  
4           a management application executed by a processor configured to scan the plural-  
5   ity of PCPIs to create an index of data structures on the at least one destination storage  
6   system, wherein each data structure comprises a plurality of qtree versions each created at  
7   different points in time;  
8           the management application further configured to select a particular data structure  
9   to view and further configured to return all qtree versions created at the different points in  
10   time for the particular data structure; and  
11          a user interface configured to display all the returned qtree versions created at dif-  
12   ferent points in time, and further configured to allow a user to select a particular qtree  
13   from all the returned qtree versions to restore.